of sidewall spacer structures **140**A positioned adjacent to the upper mandrel structures **130**A of the patterned upper mandrel layer **130**X above the first region **110** of the substrate **120**. The regions **112** and **114** are substantially cleared of the layer of spacer material **140**.

FIG. **2**E illustrates the product **100** after an etching process was performed to remove the upper mandrel layer **130**, including the upper mandrel structures **130**A of the patterned upper mandrel layer **130**X, from all three regions of the substrate **120** relative to the surrounding materials. This operation results in a first patterned spacer masking layer **140**X that is positioned only above the first region **110** of the substrate **120**. In at least one illustrative embodiment, sidewall structures **140**A of the first patterned spacer masking layer **140**X have a lateral width **141** and a pitch **143**, which may be approximately 20 nm and 60 nm, respectively.

FIG. **2**F depicts the product **100** after several process operations were performed. First, a masking layer **144**, such as OPL, and an ARC layer **146** were formed across all three regions **110**, **112** and **114** of the substrate **120**. Thereafter, a patterned layer of photoresist material **148** was formed on the product **100**. As depicted, the patterned layer of photoresist material **148** covers the second and third regions **112**, **114**, while leaving the first region **110** exposed.

FIG. **2**G depicts the product **100** after several process operations were performed. First, with the patterned photoresist mask **148** (FIG. **2**F) in position above the first and third regions **112**, **114**, the ARC layer **146** and the OPL layer **144** were selectively removed from above only the first region **110** of the substrate **120**. This exposes the patterned spacer masking layer **140**X. Next, the patterned photoresist mask **148** and ARC layer **146** were removed from above the second **112** and third **114** regions of the substrate **120**. These operations leave the remaining portions of the OPL layer **144** positioned above the second and third regions **112**, **114**, but the first region **110** is cleared of the OPL layer **144**, thereby exposing the first patterned spacer masking layer **140**X.

FIG. **2**H depicts the product **100** after one or more anisotropic etching processes were performed through the first patterned spacer masking layer **140**X to remove the exposed portions of the upper hard mask layer **128** and the lower mandrel layer **126** to transfer the pattern of the features **140**A (with width **141** and pitch **143** (FIG. **2**E)) in the first patterned spacer masking layer **140**X to the lower mandrel layer **126** above the first region **110** of the substrate **120**. This process operation results in the formation of a patterned lower mandrel layer **126**X comprised of lower mandrel features **126**A. During this etching process, the OPL layer **144** above the second and third regions **112**, **114** protects the upper hard mask layer **128** and the lower mandrel layer **126** in those regions from the etching processes.

FIG. **2**I depicts the product **100** after layers above the upper hard mask layer **128** were removed, i.e., after the OPL layer **144** was removed (from above regions **112** and **114**) and after the first patterned spacer masking layer **140**X was removed (from above the region **110**). These materials may be removed in any desired order. These process operations make the upper hard mask layer **128** the uppermost layer of material on the product **100** at this point in the process flow (patterned in the first region **110** and un-patterned in the regions **112**, **114**).

FIG. **2**J depicts the product **100** after another protective layer **154**, e.g., an OPL layer, was formed above all three regions **110**, **112**, **114** above the substrate **120**. The thickness of the protective layer **154** may vary depending upon the application.

FIG. **2**K depicts the product **100** after a timed, recess etching process was performed for a sufficient duration so as to remove substantially all of the protective layer **154** from above the second and third regions **112**, **114**, while leaving a recessed protective layer **154**R positioned above the first region **110**. The removal of the protective layer **154** from above the second and third regions **112**, **114** exposes the upper hard mask layer **128** in the second and third regions **112**, **114**. More specifically, the recess etching process is performed for a sufficient duration such that the upper hard mask layer **128** (with features **128**A) is positioned above the upper surface of the recessed protective layer **154**R in the first region **110** of the substrate **120**. The final height of the recessed protective layer **154**R may vary depending upon the application, i.e., the exposed height of the features **126**A of the patterned lower mandrel layer **126**X may vary depending upon the particular application.

FIG. **2**L depicts the product **100** after an etching process was performed to remove the upper hard mask layer **128** (including the features **128**A) relative to the surrounding materials above all three regions **110**, **112**, **114** of the substrate **120**. The recessed protective layer **154**R protects the lower hard mask layer **124** above the first region **110** of the substrate **120** from the etching process, while the layer **126** protects the layer **124** in the second and third regions **112**, **114**.

FIG. **2**M depicts the product **100** after an etching process was performed to remove the recessed protective layer **154**R from above the first region **110** of the substrate **120**.

FIG. **2**N depicts the product **100** after several process operations were performed. First, a masking layer **156**, such as OPL, and an ARC layer **158** were formed across all three regions **110**, **112** and **114** of the substrate **120**. Thereafter, a patterned layer of photoresist material **160** was formed on the product **100**. As depicted, the patterned layer of photoresist material **160** covers the first region **110** and is patterned above the second and third regions **112**, **114**, thereby leaving portions of the second and third regions **112**, **114** exposed.

FIG. **2**O depicts the product **100** after several process operations were performed. First, one or more anisotropic etching processes were performed to etch the lower mandrel layer **126** in the second and third regions **112**, **114** using the patterned masking layer **160** positioned above the second and third regions **112**, **114** as an etch mask, while the first region **110** remains protected by the masking layer **160**. Thereafter, the patterned masking layer **160**, ARC layer **158**, and protective layer **156** were removed from above all three regions **110**, **112**, and **114** of the substrate **120**. As a result of these operations, two additional sets of lower mandrel structures **126**B, **126**C were defined. In total, the patterned lower mandrel layer **126**X depicted in FIG. **2**O is comprised of features **126**A (above the first region **110**), the features **126**B (above the second region **112**) and the features **126**C (above the third region **114**).

FIG. **2**P depicts the product **100** after another layer of spacer material **166** was deposited above the substrate **120** and the patterned lower mandrel layer **126**X. In at least one illustrative embodiment, the layer of spacer material **166** may be approximately 15 nm thick and it may be made of silicon dioxide. The thickness and material of the layer of spacer material **166** may vary depending upon the application.